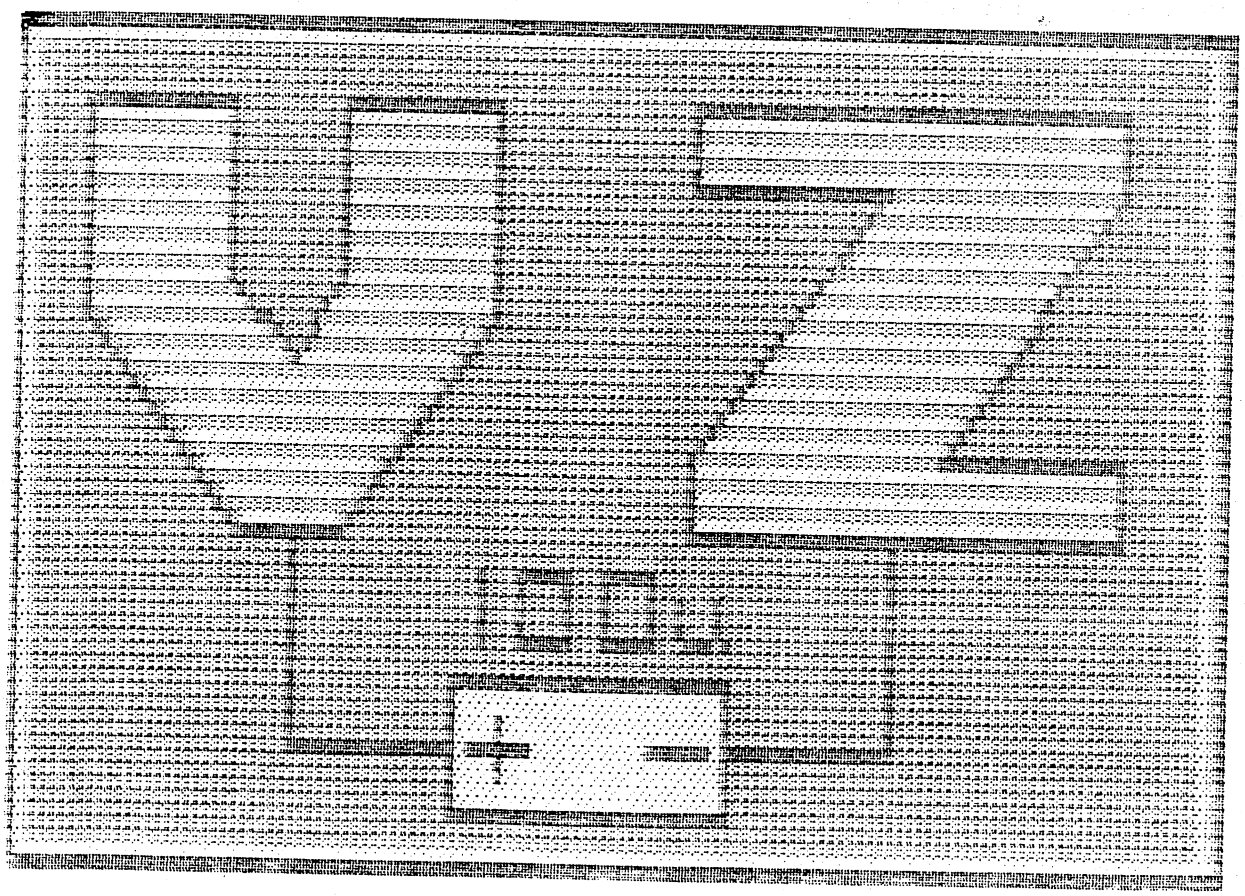
JULY/AUG 1990 ISSUE # 31

VZ 200/300

HUNTER VALLEY VZ JOURNAL



PRODUCED BI-MONTHLY BY H.V.VZ.U.G.
A NON PROFIT ORGANIZTION

** ** EDITOR'S COMMENTS ** **

THE CIRCUIT DIAGRAMS WERE DONE WITH A CAD (COMPUTER AIDED DESIGN) PROGRAM ON AN IBM PC COMPATIBLE COMPUTER. THE TEXT WAS COMPILED USING DISK WORD PROCESSOR PATCH 3.3 AND HI-RES SCREEN DUMPS WITH LARRY TAYLOR'S PRINTER PATCH V1.4.

HELP - SELL & TELL — PAGES 3-4

WE NEED YOUR HELP WITH A COUPLE ARTICLES WE'RE PLANNING FOR THE JOURNAL. ONE IS ON POKES AND THE OTHER ON THE INPUT/OUTPOT PORT.

CHANGE GRAPHICS BY BRIAN GREEVE — PAGE 4

I MADE AN ERROR IN LAST ISSUE AND PRINTED THE WRONG VERSION. ED.

VZ RS-232 SERIAL PORT UPDATE — PAGE 5

A MEANS OF TESTING PORT WITH A SINGLE VZ HAS BEEN FOUND AND A REGISTER OF MODEM USERS IS PLANNED AND IF YOU WANT TO BE ON THE LIST THEN LET US KNOW.

DSE D'BASE UTILITIES BY J. D'ALTON — PAGE 6

OWNERS OF DSE DISK DATABASE CAN ADD LOTS OF EXTRA FEATURES. FOR MORE DETAILS CONTACT JOHN D'ALTON.

VZ CAPACITANCE TESTER BY GARY BULLEY — PAGES 7-10

NOW YOU KNOW WHAT THE FRONT COVER IS ABOUT. THANKS TO GARY THE VZ CAN BE USED AS A TEST INSTRUMENT AS WELL AS RUNNING THE USUAL APPLICATION PROGRAMS. OTHER TEST INSTRUMENTS ARE POSSIBLE ALSO.

ASSEMBLER ROUTINES BY BEN HOBSON — PAGES 11-12

OUR LATEST CONTRIBUTOR IS PROVIDING BUDDING ASSEMBLER USERS WITH SOME SMALL ROUTINES TO GET THEM STARTED WITH MORE IN NEXT ISSUE.

SET(X,Y)-POKE-M/C BY JOE LEON — PAGE 13

THE THREE WAYS OF CREATING A HI-RES COLOUR SCREEN IS DEMONSTRATED FROM BASIC TO MACHINE CODE AND YOU DON'T HAVE TO UNDERSTAND M/C TO USE IT.

MULTIPLE USR CALLS BY GARY BULLEY — PAGE 14

IF YOU'RE CALLING A LOT OF M/C ROUTINES FROM BASIC THEN THE 4 BYTE M/C ROUTINE WILL MAKE IT LOTS EASIER THAN HAVING TO WORK OUT LO/HI BYTE AND POKING IT.

FLICKER-FREE GRAPHICS BY BOB KITCH — PAGES 15-16

THIS IS THE FIRST PART OF THE LAST ON THE GRAPHIC SERIES IN WHICH BOB HAS DONE A TREMENDOUS JOB IN EXPLAINING IT ALL TO US NOVICES.

CHANGE GRAPHICS BY BRIAN GREEVE — PAGE 17

ANOTHER ERROR IN LAST ISSUE WITH WRONG M/C ADDRESSES. ED.

VZ MODEM SOFTWARE AND FAST M/C DISASSEMLER SOFTWARE — PAGE 18

USER GROUPS * NEWS * SUBS — PAGE 19

DECEMBER 7 - CHRISTMAS PARTY - BRING FAMILY - FRIENDS - PLATE - HOT & COLD LIQUIDS PROVIDED. ALL WELCOME INCLUDING YOUR MOTHER IN LAW. SEE YOU THERE.

SOFTWARE FOR SALE - PATCH3.3 EXTENDED DOS & MENU-FILE COPIER — PAGE 20

THANKS AGAIN: FOR YOUR CONTINUED WELL WISHES FOR MY HEALTH. IT MUST BE WORKING AS THIS ISSUE TOOK ONLY A QUARTER OF THE TIME I SPENT ON PREVIOUS ONES AND I'M FEELING MUCH BETTER. ON THE OTHER HAND IT COULD BE THE WARMER WEATHER, BUT I LIKE TO THINK IT WAS YOUR CONCERN FOR MY HEALTH, MUCH APPRECIATED.

THANKS FOR YOUR HELP: THE NEWCASTLE COMPUTER SHOW WAS THE BEST EVER FOR US. I WOULD LIKE TO THANK GARY BULLEY, PETER JONES AND ROSS WOODS FOR THEIR HELP IN MANNING THE BOOTH AND DEMONSTRATING AND REPRESENTING THEIR CLUB WHICH THEY DID VERY WELL.

ALSO A SPECIAL THANKS TO JOHN D'ALTON AND JASON OAKLEY FOR THEIR DEMO PROGRAMS AND LAST A VERY BIG THANKS TO BOB KITCH FOR HIS EXELLENT FLICKER FREE HI-RES SLIDE SHOW WHICH AMAZED ALL THOSE WHO SAW IT.

JOE LEON - SECRETARY/EDITOR

RS-232 PORT: THANKS FOR THE LATEST ISSUE OF THE JOURNAL. IT HAS SOME VERY INTERESTING ARTICLES. I AM ESPECIALLY INTERESTED IN THE RS-232 SERIAL PORT SINCE I AM WORKING ON AN ELECTRONICS PROJECT WHICH WILL BE DESIGNED TO INTERFACE TO RS-232. BEST WISHES AND CONGRATULATIONS ON A MOST INFORMATIVE JOURNAL. . . HERMAN NACINOVICH.

THANKS: ALL AUTHORS, MYSELF INCLUDED LIKE TO KNOW THAT THEIR EFFORTS ARE APPRECIATED AND IT GIVES THEM INCENTIVE TO CARRY ON. PETER AND ANDY HICKMAN HAVE DONE AN EXELLENT JOB ON THE RS-232 SERIAL PORT WHICH HAS BROADENED THE VZ'S PERFORMANCE AND THEY RIGHTFULLY DESERVE CREDIT FOR A JOB WELL DONE.

HELP 1: DOES ANYONE KNOW OF ANY SHAREWARE OR LOW COST CROSS ASSEMBLER THAT CAN ASSEMBLE Z80 OR 6800 INSTRUCTIONS ON AN IBM PC. IF YOU CAN HELP PLEASE CONTACT THE EDITOR OR:

HERMAN NACINOVICH BERYL ROAD GULGONG NSW 2852

HELP 2: I'M AFTER CIRCUIT DIAGRAM FOR VZ300 MEMORY EXPANSION AS I'V SEVERAL AWAITING REPAIRS. ED.

HELP 3: POKES, POKES AND MORE POKES. I'M COMPILING A LIST POKES FOR THE VZ WITH THE VIEW TO PUBLICATION IN THE JOURNAL. IF ANYONE CAN HELP OUT NO MATTER HOW SMALL YOUR CONTRIBUTION IT WILL BE APPRECIATED. HERE'S A COUPLE TO GET YOU STARTED. ED.

POKE 31003,1 - TRON (TRACE ON)
POKE 31003,0 - TROFF (TRACE OFF)

HELP 4: INPUT/OUTPUT PORT MAPPING - THE ORIGINAL VZ I/O PORT HAS SEEN SOME EXPANSION AND WE'RE TRYING TO BRING IT UP TO DATE. IN THE LAST FEW ISSUES OF THE JOURNAL IT WAS EXPANDED EVEN FURTHER AND WE'RE PLANNING EVEN MORE EXPANSION. WE'RE ARE TRYING TO AVOID PORT DUPLICATION SO IF YOU KNOW OF ANY PORT THAT IS BEING USED IN A PROJECT THEN WE'LD APPRECIATE YOUR HELP IN THIS REGARD.

MEMORY EXPANSION: AT LONG LAST LARGE MEMORY EXPANSION FOR THE VZ IS BOTH FEASIBLE AND CHEAP. IN NOT TO DISTANT FUTURE IT WILL BE THE ONLY WAY FOR VZ USERS TO UPGRADE. TO WET YOUR APPETITE HERE ARE SOME OF THE MORE EXITING NEW MEMORY CHIPS:

128K X 8 BIT SRAM (STATIC RAM) - \$62.00 - \$76.00
256K X 4 BIT DRAM (DYNAMIC RAM) - \$13.00 -

A RAMDISK USING ONE 128K X 8 AND ONE 32K X 8 SRAMS IS NOW POSSIBLE FOR BOTH TAPE AND DISK USERS. MORE ON IT NEXT ISSUE. ED.

CHANGE GRAPHICS BASIC LISTING BY BRIAN GREEVE

ERROR & APOLOGY: IN ISSUE # 29, PAGE 11, THE BASIC LISTING FOR 'CHANGE GRAPHICS' IS INCORRECT AS IT IS A REPRODUCTION OF THE 'TANDY PRINTER PATCH' FROM ISSUE # 28, PAGE 5. THE CORRECT LISTING IS SHOWN BELOW AND MY APOLOGIES TO BRIAN AND OUR READERS. THE MISTAKE WAS MINE, NOT BRIAN'S.

```
010 FOR I = 29184 TO 29257
020 READ A:POKE I,A
030 CHECKSUM = CHK+A:NEXT
040 :
050 DATA 205,201,1,33,233,122,34,164,120,35,35,35,35,126,254,34
060 DATA 40,18,254,0,32,246,35,182,32,239,35,182,32,236,34,249
070 DATA 120,195,25,26,35,126,254,34,40,226,254,0,40,232,254,127
080 DATA 56,242,254,191,56,9,254,223,56,9,214,192,119,24,229,62
090 DATA 35,24,249,214,128,24,245,255,0,0
100 :
110 IF CHECKSUM <> 8865 THEN PRINT"DATA ERROR":END
120 :
130 CLS:PRINT"SAVE TO DISK OR TAPE   (D/T)"
140 A1$=INKEY$:A$=INKEY$:IF A$<>"D"AND A$<>"T"THEN140
150 SOUND 30,1:IF A$="T"THEN260
160 IF PEEK(16384) = 170 THEN140
170 PRINT"NO DISK DRIVE TO USE"
180 GOTO260
190 :
200 PRINT"INSERT DISK,CLOSE DOOR & PRESS  RETURN"
210 IF INKEY$<>CHR$(13)THEN150
220 SOUND 30,1
230 BSAVE"GRAFICHG",7200,7249
240 END
250 :
260 FOR I = 29440 TO 29487
270 READ A: POKE I,A: NEXT
280 PRINT"INSERT CASSETTE,PRESS PLAY &    RECORD THEN RETURN"
290 IF INKEY$ <> CHR$(13) THEN220
300 SOUND 30,1
310 POKE 30862,0:POKE 30863,115:X=USR(0)
320 END
330 :
340 DATA 33,0,114,34,164,120,33,73,114,34,249,120
350 DATA 33,38,115,14,241,243,205,172,52,251,33,233,122
360 DATA 34,164,120,205,248,26,35,34,249,120
370 DATA 195,25,26,34,71,82,65,70,73,67,72,71,34
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RS-232 SERIAL PORT UPDATE

DEAR JOE, THANK YOU FOR YOUR SUPPORT OF OUR MODEM PROJECT. IT MAKES SUCH A PROJECT WORTH THE EFFORT WHEN PEOPLE ACTUALLY ENJOY USING IT.

IN ISSUE # 30 YOU MENTIONED THAT TESTING OF THE PROJECT WAS A BIT DIFFICULT. THERE IS A SIMPLE WAY AROUND THIS. MAKE UP A PLUG WHICH FITS INTO THE VZ RS-232 SOCKET LIKE IN THE EXAMPLE AT BOTTOM OF PAGE OR IN THE CASE OF DB9 OR DB25 SOCKETS TEMPORARILY CONNECT PINS 2 & 3 TOGETHER. THIS CONNECTS THE TXD OUTPUT SIGNAL TO THE RXD INPUT SIGNAL SO THAT YOUR MODEM TALKS TO ITSELF.

BOOT UP THE MODEM SOFTWARE, SELECT FULL DUPLEX AND ENTER THE TERMINAL MODE. SELECT CTRL-8 OR CTRL-9 TO TEST. A CONTINOUS STREAM OF IDENTICAL CHARACTERS SHOULD BE SENT AND RECEIVED BY YOUR MODEM. WITH CTRL-8 YOU SHOULD SEE A DISPLAY OF U'S. WITH CTRL-9 YOU SHOULD SEE A STREAM OF IDENTICAL GRAPHIC BLOCKS.

IF THE DATA IS JUMBLED YOU MAY NEED TO SELECT 2 STOP BITS. EXIT FROM THE TEST MODE WITH CTRL-C. TRY TYPING A MESSAGE. IT SHOULD APPEAR ON THE SCREEN AS YOU TYPE IT. NOW SELECT HALF DUPLEX. TWO OF EACH CHARACTER WILL APPEAR ON THE SCREEN, BECAUSE YOU ARE ECHOING BACK YOUR OWN DATA.

VZ MODEM USERS: I AM TRYING TO GET A LIST OF VZ MODEM USERS. ANYONE WHO USES A MODEM OR TERMINAL CAN BE ON THE LIST. PLEASE REALIZE THAT VZ'S CAN ONLY USE 300 BAUD AT PRESENT. (MORE ON THAT ANOTHER TIME.) IF ANYONE WANTS TO BE ON THE LIST, I NEED THEIR NAME, PHONE NUMBER, AND OPERATING TIMES. I.E. WHEN IS THE PHONE FREE?? WILL YOU SISTER, MUM, WIFE LET YOU USE THE PHONE?

I CAN BE CONTACTED MOST NIGHTS BETWEEN 7.30PM - 9.00PM. HOWEVER I PREFER TO BE CONTACTED ON SATURDAYS BETWEEN 12 NOON - 4PM. MY WIFE MAY BE USING THE PHONE DURING THE WEEK, BUT I HAVE HER PERMISSION!! TO USE IT ON SATURDAYS.

MY PHONE NUMBER IS (047) 304 880.

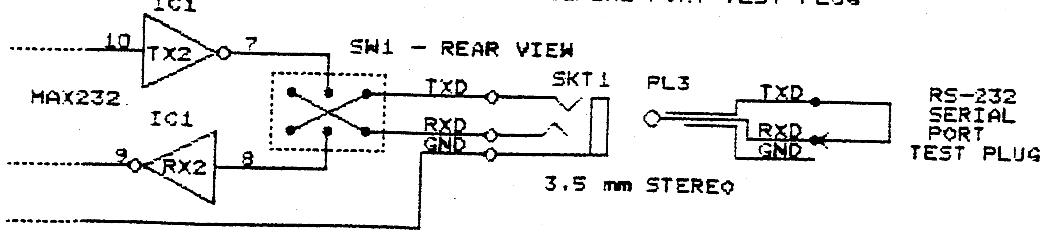
NOTE: IF YOU NEED ALL THE PROJECT DETAILS THEN SEND 5 X 43 CENT STAMPS TO COVER PHOTASTATING AND POSTAGE COSTS.

THANK YOU ON BEHALF OF ANDY AND MYSELF. PETER HICKMAN.

NOTE 1: IF VZ MODEM USERS WOULD LIKE TO HAVE THEIR DETAILS LIKE NAME, PHONE # AND PREFFERED OPERATING TIMES PUBLISHED IN THE JOURNAL AND PERIODICALLY UPDATED THEN I WOULD ONLY BE TOO HAPPY TO DO SO AT NO CHARGE TO MODEM USERS SO ITS USE CAN BE FURTHER PROMOTED. ED.

NOTE 2: SINCE THE CONSTRUCTION DETAILS IN LAST ISSUE OF THE RS-232 PORT I HAVE UPDATED VEROBOARD LAYOUT SO THAT BOTH THE MAX232 AND 74LS74 ARE ON IT NOW SO THAT PIGGY-BACKING IS NO LONGER NECESSARY MAKING CONSTRUCTION MUCH SIMPLER. THIS IS SUPPLIED BY PETER WHEN YOU PURHASE THE SOFTWARE FROM HIM OR A SSAE ADDRESSED TO THE EDITOR WILL GET YOU THE SAME. JOE LEON, EDITOR.

VZ 200/300 RS-232 SERIAL PORT TEST PLUG



UTILITIES FOR DSE DISK DATABASE 31/6

BY JOHN D'ALTON

NOW THAT I NO LONGER PUBLISH MY OWN MAGAZINE LE'VZ 200/300 OOPs I HOPE TO HAVE TIME TO CONTRIBUTE TO THE REMAINING VZ NEWSLETTERS.

THESE UTILITIES AND MODIFICATIONS ARE FOR USE WITH AND TO ENHANCE THE DATABASE UNIT THAT WAS WRITTEN BY MR PHIL MAUDE (PM DB) AND SOLD BY DICK SMITH ELECTRONICS. IT IS A DISK BASED UNIT ONLY.

MR MAUDE HAS NOW LIFTED COPYRIGHT ON THE UNIT SO IT IS NOW IN THE PUBLIC DOMAIN. FOR FOLK WHO WISH TO MODIFY THEIR PRESENT PM DB UNITS AND REQUIRE HELP TO "UNLOCK" IT PLEASE CONTACT MYSELF OR SOME OTHER VZ "SPECIALISTS" IN THIS REGARD. ONLY REQUESTS BY MAIL THAT INCLUDE A S.A.S.ENVELOPE WILL BE ANSWERED.

THE UNIT AS SOLD IS A BASIC UNIT TO CONSERVE MEMORY AND BE EASY TO OPERATE. I KNOW THAT THESE VARIOUS ENHANCEMENTS AND UTILITIES WILL MAKE THE ORIGINAL UNIT MORE USEFUL THAN EVER. THESE SECTIONS COULD BE ADDED TO THE ORIGINAL PM DB AS REQUIRED OR AS STAND ALONE UNITS.

1. TRANSFER DATA FROM MAILLIST:

THIS TRANSFERS DATA FROM THE DSE MAILLIST DISK UNIT WHICH IS A MODIFIED UNIT. NO NEED TO TO TYPE IN ALL YOUR DATA.

2. ALTER THE SYSOP DATA:

WITH THE ORIGINAL PM DB, THERE IS NO WAY OF ALTERING THE AMOUNT OF FIELDS, THE LENGTH OF THEM OR THE AMOUNT OF COLUMNS FOR THE PRINTER. NOW ALL THESE CAN BE CHANGED, ADDED TO OR DELETED.

3. SEARCH ON ANY FIELD:

THE ORIGINAL PM DB ALLOWS SEARCHING ON THE FIRST FIELD ONLY. NOW A SEARCH CAN BE PERFORMED ON ANY FIELD AND ALL THE WAY ALONG IT, NOT JUST THE FIRST FOUR CHARACTERS.

4. PRINT FIELDS IN ANY ORDER:

YOU CAN SELECT THE FIELDS TO BE PRINTED AND IN ANY ORDER.

5. SORT ON ANY FIELD:

THIS ALLOWS ALPHA SORT ON ANY FIELD, NOT JUST THE FIRST FIELD.

6. EDIT ON SCREEN:

EACH FIELD IS PRINTED ON SCREEN SO ALLOWING YOU TO RUN THE CURSOR ALONG IT OR TYPE NEW DATA.

7. EDIT SELECTED RECORD:

IF FOR INSTANCE THERE ARE THREE ZUBRIGEN RECORDS, YOU CAN EDIT THE FIRST, SECOND OR THIRD RECORD, NOT JUST THE FIRST ONE.

I MAY BE ABLE TO PUT FORWARD SOME OTHER ENHANCEMENTS IN DUE COURSE, OR PERHAPS FOLK COULD CONTACT ME FOR HELP ON OTHER FEATURES THAT MAY BE REQUIRED.

I WILL EITHER WAIT FOR PEOPLE WHO ARE INTERESTED TO CONTACT EITHER THE EDITOR OF THIS MAGAZINE OR MYSELF, OR I SHALL GO AHEAD AND SUBMIT THE INFORMATION IN DUE COURSE. . . . (J.D.)

JOHN D'ALTON 39 AGNES STREET TOOWONG QLND 4066

VZ CAPACITANCE TESTER
BY GARY BULLEY

THIS PROJECT IS BUILT AROUND THE POPULAR 555 TIMER CHIP. IT IS A VERY VERSATILE CHIP MADE FOR PRECISION TIMING APPLICATIONS. WHEN IT IS CONNECTED IN THE ASTABLE MULTI-VIBRATOR MODE ITS OUTPUT WILL GIVE PRECISE ON AND OFF TIMES WITH RESPECT TO THE RESISTANCE AND CAPACITANCE NETWORK BEING USED.

WHEN THE OUTPUT IS ON (OR HIGH) THE CAPACITOR IS BEING CHARGED VIA 2 RESISTORS AND WHEN THE OUTPUT IS OFF (OR LOW) THE CAPACITOR IS BEING DISCHARGED VIA ONE RESISTOR. IT IS THIS LOW PART OF THE CYCLE I HAVE USED IN THIS PROJECT. BY CONSTANTLY MONITORING THE OUTPUT OF THE TIMER, VIA THE INPUT PORT OF THE VZ, WE CAN DETECT WHEN THE TIMER GOES FROM ITS HIGH TO LOW STATE.

THEN BY INCREMENTING A COUNTER FOR THE PERIOD THAT THE OUTPUT IS LOW WE WILL THEN HAVE A VALUE OR "NUMBER" WHICH REPRESENTS THE RESISTOR AND CAPACITOR BEING USED. IF ONE OF THESE COMPONENTS WERE TO BE CHANGED THEN A NEW NUMBER WOULD RESULT, BUT THIS NEW NUMBER WOULD HAVE RELATIONSHIP TO THE OLD NUMBER, SO ONCE WE KNOW THE NUMBER FROM THE COUNTER WE CAN USE IT IN VARIOUS WAYS. IN THE CAPACITANCE TESTER I HAVE ELECTED TO USE FOUR DIFFERENT VALUES OF FIXED RESISTANCE AND THE CAPACITOR IS THE COMPONENT THAT VARIES.

THE COUNTING IS DONE IN A MACHINE CODE PROGRAM AND THE HL REGISTER PAIR IS USED AS THE COUNTER. IN EACH OF THE FIRST THREE RANGES THE MAXIMUM COUNT THAT CAN BE ACHIEVED IS 255 THEN AN OVERFLOW WILL OCCUR AND THE "CHANGE RANGE" MESSAGE WILL APPEAR ON THE SCREEN. TO ACHIEVE THIS MAXIMUM COUNT FOR EACH RANGE A CAPACITOR EQUAL TO THE MAXIMUM VALUE FOR THAT RANGE IS CONNECTED AND ITS RESISTOR IS ADJUSTED TO GIVE A COUNT OF 255.

THE BOTTOM END IS A DIFFERENT STORY, AN OFFSET HAS TO BE ADDED TO GIVE THE CORRECT READING AT THE BOTTOM END OF THE RANGE. TO DO THIS EACH RANGE HAS A NEGATIVE VALUE ASSIGNED TO THE VARIABLE B, (LINES 210, 240, 270 AND 300 IN THE BASIC PROGRAM), THIS VALUE IS POKED INTO THE COUNTER SO THAT THE COUNTER ACTUALLY COUNTS BACK FROM A NEGATIVE NUMBER TO ZERO THEN FORWARD TO 255.

THE VALUE OF THE NEGATIVE NUMBER USED IS SELECTED TO SUIT THE CAPACITANCE AT THE BOTTOM END OF THE RANGE. WHAT WE NOW HAVE IS A COUNTER THAT WILL BE AT ZERO FOR A KNOWN VALUE OF CAPACITANCE AND 255 FOR ANOTHER KNOWN VALUE. ANY VALUE IN BETWEEEN WILL BE RELATED TO THE CAPACITOR BEING USED. THE FOURTH RANGE IS EXACTLY THE SAME THEORY EXCEPT THAT BECAUSE OF THE HIGH VALUES OF CAPACITANCE BEING USED THE COUNT IS CONSIDERABLY GREATER THAN 255.

THE CAPACITANCE TESTER IS ONLY ONE APPLICATION OF THE 555 TIMER. THERE HAS BEEN A WHOLE HOST OF CIRCUITS DESIGNED AROUND IT. BY USING THE ABOVE THEORY A LOT OF THOSE PROJECTS COULD BE ADAPTED TO SUIT THE VZ. OTHER IDEAS THAT COME TO MIND ARE :-

FREQUENCY METER.
ANALOGUE TO DIGITAL CONVERTER.
POSITION INDICATOR FOR A SHAFT OR LEVER.
TEMPERATURE METER.
LIGHT METER, ETC, ETC.

TO ANYONE THAT WISHES TO EXPERIMENT FURTHER THEN PLEASE LET US KNOW THE RESULTS OF YOUR EFFORT OR IF YOU NEED HELP OR ASSISTANCE THEN IT IS AS CLOSE AS A LETTER OR PHONE CALL TO MYSELF OR THE EDITOR. ADDRESSES AND PHONE #'S ARE AT REAR OF JOURNAL.

CONSTRUCTION:

THIS PROJECT IS DESIGNED TO BE PLUGGED INTO THE 8 BIT INPUT PORT FEATURED IN ISSUE # 30 OF THE JOURNAL AND WONT WORK WITHOUT IT.

CONSTRUCTION IS STRAIGHT FORWARD. CUT A PIECE OF VERO BOARD TO FIT THE LENGTH OF A SMALL UTILITY BOX AND CUT THE COPPER STRIPS AS SHOWN BY X'S. SOLDER IN THE EIGHT WIRE BRIDGES FIRST (NOT FORGETTING THE ONE MOUNTED UNDER THE I.C.) FOLLOWED BY THE REMAINING COMPONENTS. NEXT, USING SHORT LENGTHS OF HOOKUP WIRE, (PIECES FROM RIBBON CABLE ARE IDEAL) SOLDER IN THE 3 POLE 4 POSITION SWITCH. 1 POLE ISN'T USED.

MAKE SURE TO ORIENTATE THE LEADS CORRECTLY. SOLDER IN TWO PIECES OF REASONABLY HEAVY FLEXIBLE CABLE ABOUT 6 CM'S TO BE USED FOR CONNECTING THE CAPACITOR UNDER TEST, MULTI METER TEST LEAD IS IDEAL. TERMINATE LEADS WITH ONE RED AND ONE BLACK ALLIGATOR CLIPS OR PREFERABLY TEST CLIPS AS MENTIONED IN THE PARTS LIST. LAST SOLDER IN A 30 CM LENGTH OF SEVEN WIDE RIBBON CABLE WITH A 15 PIN 'D' PLUG ATTACHED TO COMMUNICATE WITH THE VZ VIA THE 8 BIT INPUT PORT.

THE VERO BOARD FITS VERTICALY AND LENGTHWISE IN THE BOX AND AS FAR TO ONE SIDE AS POSSIBLE SO AS TO ALLOW ROOM FOR MOUNTING THE SWITCH ON THE LID. AT ABOUT THE MIDDLE OF THE LID AND UP TOWARDS THE SIDE A BIT DRILL A HOLE FOR MOUNTING THE SWITCH. AT ONE END OF THE BOX CUT TWO SLOTS AT THE TOP OF THE BOX FOR FOR THE CAPACITOR LEADS TO FIT SO THAT WHEN THE LID IS SCREWED DOWN IT WILL HOLD THE LEADS IN PLACE FIRMLY. CONNECT A BLACK ALLIGATOR OR TEST CLIP TO THE GROUND LEAD AND A RED ONE TO THE OTHER LEAD.

CALIBRATION:

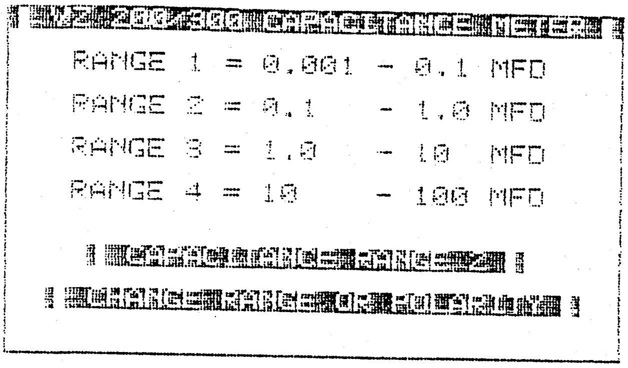
THE ONLY REAL WAY TO CALIBRATE THE TESTER PROPERLY IS TO USE CAPACITORS OF A KNOWN VALUE. IF YOU HAVE NONE AVAILABLE THEN YOUR TESTER WILL ONLY BE AS GOOD AS THE ERROR OF THE ONES THAT YOU USE WHICH WILL STILL BE ACCEPTABLE BY MOST STANDARDS.

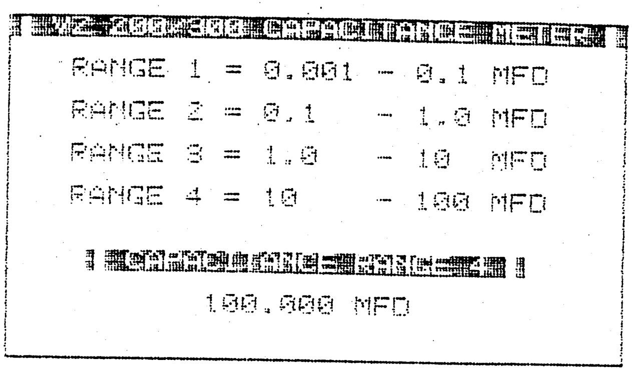
THE CALIBRATION PROCEDURE FOR EACH OF THE FOUR RANGES IS THE SAME THE ONLY DIFFERENCE BEING THE VALUE OF THE CAPACITORS FOR EACH RANGE. FOLLOW THE STEPS BELOW AND YOU SHOULD HAVE NO PROBLEMS. IN STEP 5 YOU WILL HAVE TO LIST THE PROGRAM AND ALTER THE VALUE ASSIGNED TO VARIABLE 'B' FOR THE PARTICULAR RANGE YOU ARE WORKING ON.

ONCE YOU HAVE ESTABLISHED THE CORRECT VALUES IN YOUR BASIC PROGRAM THEN THIS IS THE PROGRAM YOU SAVE AND USE WITH YOUR SYSTEM. IT MAY PAY YOU TO WRITE THESE FIGURES DOWN AND SAVE THEM SOMEPLACE IN CASE YOU SHOULD EVER LOSE YOUR ORIGINAL PROGRAM IN SOME WAY OTHERWISE YOU'LL HAVE TO RECALIBRATE.

YOU'LL NEED THE TEST CAPACITORS AS SHOWN IN THE PARTS LIST:

STEP 1: SELECT THE REQUIRED RANGE.
STEP 2: CONNECT THE CAPACITOR FOR THE HIGH END OF THE RANGE.
STEP 3: ADJUST THE TRIMPOT TO READ THAT VALUE.
STEP 4: CONNECT THE CAPACITOR FOR THE LOW END OF THE RANGE.
STEP 5: CHANGE THE VALUE IN BASIC OF VARIABLE B FOR THE RANGE THAT YOU ARE CALIBRATING.
STEP 6: REPEAT STEPS UNTIL THE RANGE READS CORRECTLY AT EACH END.





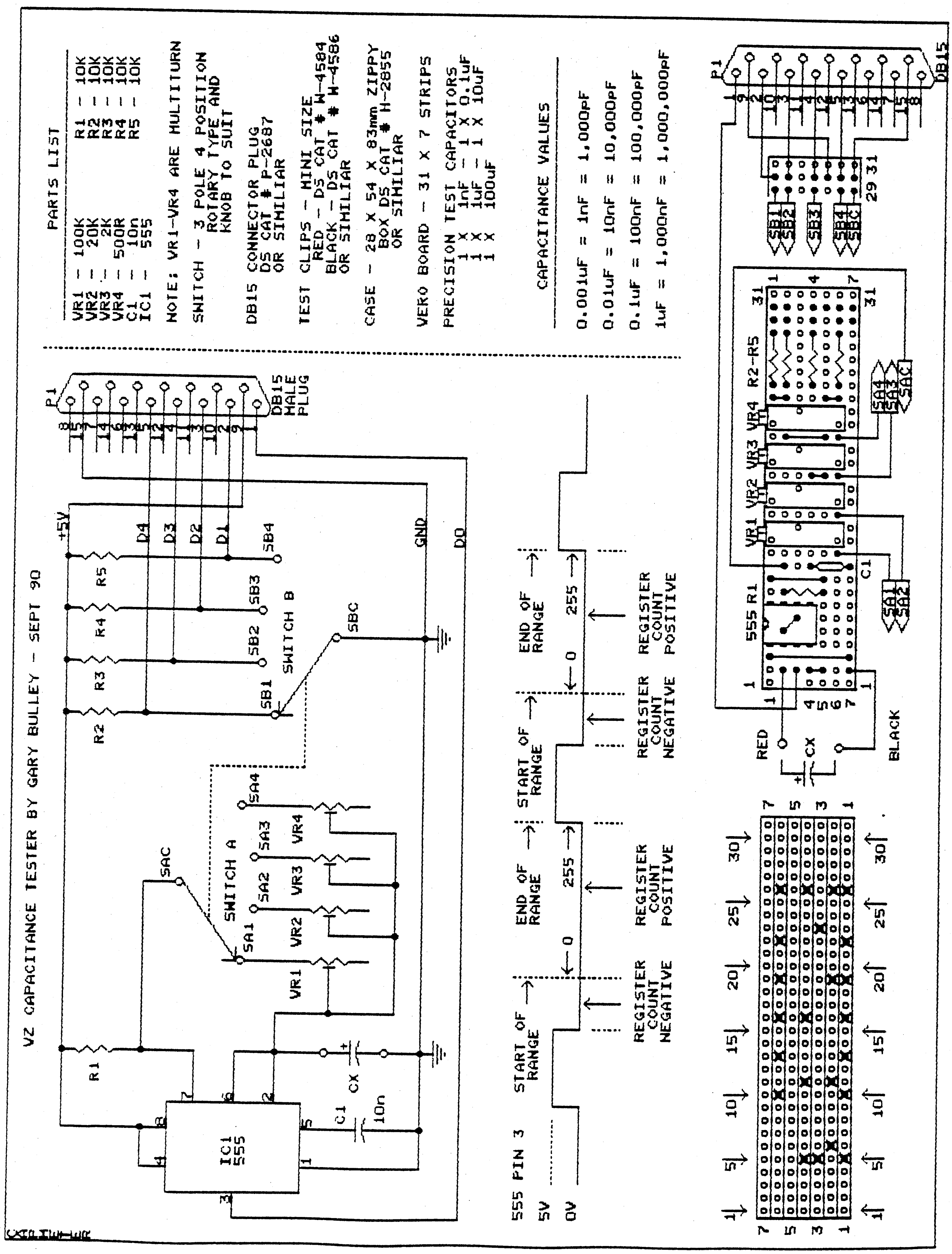

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10 '*** VZ CAPACITANCE TESTER BY GARY BULLEY - 1990 ***
20 :
30 POKE30862,43:POKE30863,122
40 DATA33,0,255,243,219,1,203,71,40,250,219,1,203,71,32
50 DATA250,219,1,203,71,32,3,35,24,247,251,34,41,122,201
60 FOR I=31275 TO 31304:READ A:POKE I,A:NEXT
70 A$="###.###":POKE 30777,1
90 :
100 CLS:COLOR7:PRINT"[illegible]";
110 PRINT
120 PRINT"   RANGE 1 = 0.001 - 0.1 MFD":PRINT
130 PRINT"   RANGE 2 = 0.1   - 1.0 MFD":PRINT
140 PRINT"   RANGE 3 = 1.0   - 10  MFD":PRINT
150 PRINT"   RANGE 4 = 10    - 100 MFD":PRINT
160 PRINT@354,"  [illegible]"
170 PRINT@418,"                            ":REM 28 SPACES
185 :
190 A=INP(1):A=A AND 30
195 :
200 'RANGE *** 0.001 TO 0.1 MFD ***
210 IF A=14 THEN B=254:C=.099:D=.001:PRINT@376,"[illegible]":GOTO 450
220 '
230 'RANGE *** 0.1 TO 1.0 MFD ***
240 IF A=22 THEN B=228:C=.9:D=.1:PRINT@376,"[illegible]":GOTO 450
250 '
260 'RANGE *** 1.0 TO 10 MFD ***
270 IF A=26 THEN B=228:C=9:D=1:PRINT@376,"[illegible]":GOTO 450
280 '
290 'RANGE *** 10 TO 100 MFD ***
300 IF A=28 THEN B=169:C=90:D=10:PRINT@376,"[illegible]"
310 '
400 POKE 31276,B:X=USR(X)
410 IF PEEK(31274)>3 THEN 460
420 E=PEEK(31273)+(255*(PEEK(31274)))
430 PRINT@426,USING A$;(((C/765)*E)+D);:PRINT" MFD "
440 GOTO 190
450 POKE31276,B:X=USR(X)
460 IF PEEK(31274)>0 THEN 500
465 :
470 E=PEEK(31273)
480 PRINT@426,USING A$;(((C/255)*E)+D);:PRINT" MFD"
490 GOTO 190
495 :
500 PRINT@418,"[illegible]"
510 SOUND 25,1;0,9:GOTO 160
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NOTE: SAVE BEFORE RUNNING:

VZ CAPACITANCE TESTER CONT. 31/10

IF PROGRAM SEEMS TO HANG UP TRY CHANGING RANGE OR POLARITY AND YOU MAY HAVE TO WAIT A FEW SECONDS FOR A RESULT. THE RANGE SELECTED IS DISPLAYED ON THE SCREEN SO NO MARKINGS ARE NECESSARY ON BOX.

NOTE: THE DESIGN COULD BE IMPROVED AND IF YOU HAVE ANY SUGGESTIONS ON HOW TO THEN LET US KNOW AND WE'LL CONSIDER IT.



SMALL ASSEMBLER ROUTINES BY BEN HOBSON

SMALL ROUTINES IN ASSEMBLER TO HELP YOU WRITE BETTER PROGRAMS

MANY OF YOU WILL HAVE A TAPE OR DISK ASSEMBLER OF SOME SORT. YOU MAY WANT TO WRITE MORE PROGRAMS IN IT BUT ARE WONDERING HOW TO CONVERT SOME SIMPLE BASIC ROUTINES INTO ASSEMBLY LANGUAGE.

THIS ARTICLE CONTAINS SOME SHORT ROUTINES TO HELP YOU GET ON YOUR WAY. AS THEY STAND ON THEIR OWN THEY WILL NOT DO MUCH. THEY MUST BE PUT TOGETHER TO DO SOMETHING USEFUL. THE PROGRAM THAT MOVES A DOT AROUND THE SCREEN IS SUCH A PROGRAM.

WHEN YOU FIRST LOOK AT ASSEMBLER IT MAY BE PRETTY MEANINGLESS BUT AS YOU WRITE MORE PROGRAMS AND THEREFORE LEARN MORE YOU UNDERSTAND IT BETTER. SOME OF THE ROUTINES I HAVE WORKED OUT MYSELF,OTHERS FROM THE TECHNICAL REFERENCE MANUAL, OTHERS FROM STEVE OLNEY'S BOOK AND A FEW ARE BY JOHN MAUNDER, (THE MODE(1) ENTRY, THE HORIZONTAL LINE AND DELAY ROUTINES).

PROGRAM 1 – MODE(1):

THIS PROGRAM ENTERS MODE(1) AND CLEARS THE SCREEN.

```
        LD    A,8          ;POKE 26624,8
        LD    (6800H),A    ;(ENTER MODE(1))
        LD    HL,7000H     ;START ADDRESS TO CLEAR
        LD    DE,7001H     ;NEXT ADDRESS TO CLEAR
        LD    BC,7FFH      ;SIZE OF VIDEO RAM
        LD    (HL),0       ;CLEAR CHARACTER
        LDIR               ;EXECUTE
```

PROGRAM 2 – HORIZONTAL LINE:

THIS PROGRAM DRAWS A HORIZONTAL LINE IN MODE(1).

```
        LD    HL,7060H     ;START OF LINE
        LD    DE,7061H     ;NEXT ADDRESS
        LD    BC,30        ;NUMBER OF BYTES
        LD    (HL),255     ;COLOUR CHARACTER
        LDIR               ;EXECUTE
```

PROGRAM 3 – A DOT:

THIS PROGRAM DRAWS A DOT IN GRAPHICS. THE SAME TECHNIQUE CAN BE USED FOR POKES.

```
        LD    A,40         ;VALUE TO BE LOADED
        LD    (28800),A    ;ADDRESS TO LOAD IT TO
```

PROGRAM 4 – DELAY:

THIS PROGRAM DOES WHAT IT SAYS.

```
        LD    B,100        ;LOOP NUMBER ONE VALUE
DLY     LD    HL,6000      ;LOOP NUMBER TWO VALUE
DLY2    DEC   HL
        LD    A,H
        OR    L
        JP    NZ,DLY2
        DJNZ  DLY
```

PROGRAM 5 – FOR A LOOP:

(FOR...TO...NEXT) – THIS PROGRAM IS A LOOP.

```
        LD    B,255        ;NUMBER TO COUNT (MAX 255)
LOOP    NOP                ;REPLACE NOP WITH INSTRUCTION(S)
        DJNZ  LOOP
```

PROGRAM 6 – MUSIC:

THIS PROGRAM CONTINUES UPWARDS IN MUSIC FRQUENCIES FOREVER SO MAKE SURE YOU SAVE IT BEFORE RUNNING IT.

```
      LD   HL,1         ;SET PITCH
      PUSH HL           ;SAVE PITCH
      LD   BC,1         ;SET LENGTH
      PUSH BC           ;SAVE FRQUENCY
LOOP  POP  BC           ;RECALL FRQUENCY
      POP  HL           ;RECALL PITCH
      INC  HL           ;INCREASE PITCH
      PUSH HL           ;SAVE PITCH
      PUSH BC           ;SAVE FREQUENCY
      CALL 345CH        ;GENERATE SOUND
      JP   LOOP         ;AND BACK AGAIN FOR NEXT NOTE
```

PROGRAM 7 – MESSAGE:

THIS PROGRAM DISPLAYS A MESSAGE.

```
      CALL 1C9H         ;CLEAR THE SCREEN
MES1  EQU  $            ;MES1 EQUALS A STRING (MES1$)
*  HELLO ALL YOU VZ     ;MESSAGE LINE ONE
      DEFB 13           ;RETURN
* USERS OUT THERE       ;MESSAGE LINE TWO
      DEFB 0            ;TERMINATE MESSAGE
      LD   HL,MES1      ;LOAD HL WITH MESSAGE
      CALL 2B75H        ;DISPLAY
```

PROGRAM 8 – TWO LINES IN MODE(1):

THIS PROGRAM PUTS SOME TECHNIQUES TOGETHER.

```
      LD   A,8
      LD   (6800H),A
      LD   HL,7000H
      LD   DE,7001H
      LD   BC,7FFH
      LD   (HL),0
      LDIR
      LD   HL,7060H     ;START OF LINE ONE
      LD   DE,7061H
      LD   BC,30
      LD   (HL),255
      LDIR
      LD   HL,7120H     ;START OF LINE TWO
      LD   DE,7121H
      LD   BC,30
      LD   (HL),255
      LDIR
      LD   B,100        ;START OF DELAY
DLY   LD   HL,6000
DLY2  DEC  HL
      LD   A,H
      OR   L
      JP   NZ,DLY2
      DJNZ DLY
      JP   7B00H        ;JUMP BACK TO ASSEMBLER
```

CONTINUED NEXT ISSUE . . .

SET(X,Y)-POKE-M/C BY JOE LEON 31/13

I NEEDED SOME HI-RES DISPLAY AND MESSAGE SCREENS FOR THE NEWCASTLE COMPUTER SHOW. THE PROGRAM I WAS USING WAS A BIT PRIMITIVE, BUT IT DID THE JOB. I SOON REALISED THE SCREENS WOULD LOOK BETTER IN OTHER COLOURS BESIDES GREEN. IT DIDN'T TAKE LONG TO DISCOVER I KNEW NEXT TO NOTHING ABOUT USING SET(X, Y) WHICH HAS MYSTIFIED ME AND HAD TO GO AND LEARN THE BASICS QUICK SMART.

IT SOON BECAME OBVIOUS THAT CHANGING SCREEN COLOURS USING SET(X,Y) WAS PAINFULLY SLOW. SO I TRIED THE POKE WAY WHICH WAS A BIG IMPROVEMENT BUT STILL SLOW. THAT ONLY LEFT MACHINE CODE WHICH WAS LIKE MAGIC. THE DEMO PROGRAM DEMONTRATES ALL THREE METHODS.

MODE(1) SCREEN COLOURS:

A MODE(1) (HI-RES) SCREEN HAS A RESOLUTION OF 128 X 64, A TOTAL OF 8192 PIXELS OR SCREEN LOCATIONS WHERE WE CAN EITHER SWITCH ON OR OFF ANY PIXEL AT ANY INDIVIDUAL LOCATION.

SET(X,Y)

X = 0 TO 127 AND IS COUNTED HORIZONTALLY ACROSS THE SCREEN.
Y = 0 TO 63 AND IS COUNTED VERTICALLY DOWN THE SCREEN.

POKING SCREEN COLOURS:

THIS METHOD INVOLVES POKING ACTUAL MEMORY (VIDEO RAM) LOCATIONS WITH THE DESIRED SCREEN COLOUR CODE.

28672 = START ADDRESS OF HI-RES SCREEN.
30719 = END ADDRESS OF HI-RES SCREEN.

M/CODE SCREEN COLOURS:

THE Z80'S POWERFUL BLOCK MOVE ROUTINE IS CALLED UPON TO DO ITS MAGIC AND I'M SURE YOU'LL AGREE, IT IS LIKE MAGIC.

SCREEN COLOUR DEMO PROGRAM:

```
010 'SET(X,Y) SCREEN COLOURS
015 :
020 MODE(1):COLOR 2:'YELLOW SCREEN
025 FOR Y=0 TO 63:FOR X=0 TO 127
030 SET(X,Y):NEXT:NEXT:GOSUB 140
035 :
040 'POKE SCREEN COLOURS
045 :
050 MODE(1):C=170:'BLUE SCREEN
055 FORX=28672 TO 30719:POKE X,C
060 NEXT:GOSUB 140
065 :
070 'M/CODE SCREEN COLOURS
075 :
080 FOR X=-28687 TO -28674:READ Y:POKE X,Y:NEXT
085 POKE 30862,241:POKE 30863,143
090 DATA 33,0,112,17,1,112,1,255,7,54,255,237,176,201
095 :
100 MODE(1)
105 C=255:GOSUB 135:'RED    SCREEN
110 C=  0:GOSUB 135:'GREEN  SCREEN
115 C= 85:GOSUB 135:'YELLOW SCREEN
120 C=170:GOSUB 135:'BLUE   SCREEN
125 GOTO105
130 :
135 POKE-28677,C:X=USR(X)
140 SOUND 25,2:FOR D=1 TO 500:NEXT:RETURN
```

MULTIPLE USR CALLS ROUTINE MODIFIED BY GARY BULLEY

THE ORIGINAL USR CALL ROUTINE APPEARED IN AUSTRALIAN PERSONAL COMPUTER FEBRUARY 86 ISSUE. IT CONSISTED OF 13 BYTES AND GARY GOT RID OF SOME UNECCESSARY CODE REDUCING IT DOWN TO ONLY FOUR BYTES. ED.

IF YOU ARE WRITING A BASIC PROGRAM WHICH HAS A LOT OF CALLS TO MACHINE CODE SUBROUTINES THEN THIS PROGRAM MAY BE OF ASSISTANCE TO YOU. THE FOUR BYTE MACHINE CODE PROGRAM IS LOADED AHEAD OF YOUR BASIC PROGRAM AND ITS START ADDRESS IS LOADED INTO THE USR PROGRAM POINTER. THIS IS DONE BY USING :-

```
POKE 30862,LO BYTE:POKE 30863,HI BYTE
```

NOW EVERY TIME YOU WANT TO JUMP TO A MACHINE CODE PROGRAM, USE THE COMMAND X=USR(ADDRESS). THE (ADDRESS) BEING YOUR MACHINE CODE PROGRAM ADDRESS IN DECIMAL. THE WAY IT WORKS IS SIMPLE, BEFORE CONTROL IS PASSED TO THE USR ROUTINE (WHICH IS THE 4 BYTE ROUTINE) THE VALUE OF (ADDRESS) IS STORED IN MEMORY LOCATIONS 31009-31010 AS A LO BYTE, HI BYTE NUMBER OR ADDRESS. THE 4 BYTE PROGRAM NOW LOADS THIS ADDRESS INTO THE HL REGISTER AND USES THE COMMAND JP (HL) TO JUMP TO YOUR MACHINE CODE PROGRAM.

AFTER YOUR MACHINE CODE PROGRAM HAS ENDED ANY DATA RESULTING FROM THAT PROGRAM CAN BE STORED IN LOCATIONS 31009-31010. THIS DATA WILL THEN BE AUTOMATICALLY PASSED BACK TO BASIC TO 'X' AND IT CAN THEN BE USED IN YOUR BASIC PROGRAM.

A GOOD PLACE TO PUT THE 4 BYTES WOULD BE AT THE BEGINNING OF ONE OF YOUR MACHINE CODE PROGRAMS OR IN ONE OF THE UNUSED SECTIONS OF THE COMMUNICATION REGION AS IS USED IN THE DEMONSTRATION PROGRAM BELOW.

SOURCE CODE LISTING:-

```
;
; ## MULTI USER CALLS ##
;
        LD HL,(7921H)
        JP (HL)
```

NOTE : SAVE DEMO PROGRAM BEFORE RUNNING AND OPEN DRIVE DOOR.

```
10 'BASIC USR CALL ROUTINE DEMO PROGRAM
15 :
20 POKE31273,42:POKE31274,33:POKE31275,121:POKE31276,233
30 POKE30862,41:POKE30863,122
35 :
40 X=USR(457):PRINT@104,X;:'CLEAR SCREEN
45 :
50 FORI=0TO20:X=USR(13392)
55 NEXT:PRINT X:'BEEP
60 :
70 PRINT@0,"":X=USR(16388):'DOS RESET
```

LINE 20 POKES 4 BYTE M/CODE ROUTINE INTO MEMORY.
LINE 30 SETS UP USR M/C ROUTINE ADDRESS.
LINE 40 CALLS FIRST M/C ROUTINE WHICH IS THE CLS FUNCTION.
LINE 50-55 CALLS THE VZ BEEP FUNCTION 20 TIMES.
LINE 70-75 CALLS DOS INITIALIZING ROUTINE.

FLICKER-FREE GRAPHICS
BY BOB KITCH

MENTION THE WORD "FLICKER" AND SOME PEOPLE IMMEDIATELY THINK OF THE HORSE IN THAT WELL KNOWN TV SERIES! VZ USERS WHO HAVE PLAYED DSE'S DAWN PATROL KNOW DIFFERENTLY.

FLICKER OR HASH ON THE VZ SCREEN IS THAT ANNOYING "RUBBISH" THAT OCCURS, PARTICULARLY ON THE HI-RES SCREEN, WHENEVER ANYTHING IS WRITTEN TO VIDEO RAM (VRAM). IT IS MOST OFTEN OBSERVED WHEN GRAPHICS ARE BEING USED. THERE ARE TWO CAUSES OF FLICKER IN GRAPHICS -

I/ CRITICAL FLICKER FREQUENCY AS PERCEIVED BY THE EYE. THIS IS A FORM OF "JUMPINESS" DETECTED BY THE EYE (I.E. PHYSIOLOGICAL) WHENEVER FRAME RATES DROP BELOW 50 HZ OR 50 PER SECOND. MOVIE THEATRE PROJECTORS AND THE VIDEO SCREEN ON THE VZ ARE UPDATED EVERY 20 MSEC. AND SO SMOOTH GRAPHICS RESULT. BELOW THIS FREQUENCY, THE EYE SEES A JERKY IMAGE AS IS SOMETIMES SEEN IN OLD MOVIES.

II/ VIDEO IRREGULARITIES RESULTING FROM DISPLAY DESIGN PROBLEMS. FLICKER OR HASH IN THE VZ RESULTS FROM THE DIRECT LOADING OF VRAM FROM Z80 REGISTERS. THE ELECTRON BEAM OF THE DISPLAY SCANS EVERY 20 MSEC. INDEPENDANTLY OF THE PROGRAM INTENTIONS. VRAM IS MEMORY MAPPED INTO 512/2K BYTE AREA DEPENDING UPON MODE. CONFLICTS IN THE TIMING OF THE Z80 CPU WRITING TO - AND THE 6847 VDG READING FROM - THE VRAM CAUSE THE FLICKER.

CONSIDER THE FOLLOWING EXAMPLE TO UNDERSTAND THE EFFECT. THE ASCII CODE FOR A CHARACTER IS LOADED INTO VRAM FROM A Z80 REGISTER. THE 6847 VIDEO DISPLAY GENERATOR (VDG) TRANSLATES THIS INTO THE INTENSITY OF THE ELECTRON BEAM AS IT SCANS ACROSS THE SCREEN. THE Z80 DOES NOT, AND CANNOT, DRAW DIRECTLY ONTO THE SCREEN. THIS IS THE JOB OF THE VDG CHIP.

A SCREEN IS DRAWN EVERY 20 MSEC. BUT THE Z80 MAY LOAD DATA INTO VRAM IN A FRACTION OF A MSEC. AND AT ANY TIME. THUS, THE Z80 HAS NO IDEA OF WHERE THE ELECTRON BEAM IS WHEN IT UPDATES VRAM. THE ELECTRON BEAM SCANS ACROSS THE SCREEN MANY TIMES TO FORM A COMPLETE CHARACTER. AS THE VDG IS UPDATING THE SCREEN THE Z80 MAY CHANGE THE CHARACTER IN VRAM BEFORE IT IS COMPLETED BY THE VDG. (WHAT A CONFUSING MESS FOR THE SCREEN TO TRANSFER TO THE EYE!). A "SPLIT" SECTION OF SCREEN SCAN LINES MAY OCCUR MOMENTARILY IN THIS SITUATION.

IDEALLY, ALL INTENDED SCREEN UPDATES SHOULD TAKE PLACE AT AN "INVISIBLE MEMORY LOCATION" OR "BUFFER". AT A SUITABLE TIME, A BLOCK LOAD INSTRUCTION CAN MOVE THE BUFFER INTO VRAM. THIS TRANSFER SHOULD OCCUR AHEAD OF THE ELECTRON BEAM.

WHAT IS NEEDED IS SOME ABILITY FOR THE Z80 TO DETERMINE THE POSITION OF THE ELECTRON BEAM ON THE SCREEN AT ANY GIVEN MOMENT.

IT IS WORTH CLARIFYING HERE, SOME OF THE HARDWARE NOMENCLATURE USED SO THAT READERS ARE QUITE CLEAR AS TO WHAT IS GOING ON. VRAM AND BUFFER ARE AREAS OF MEMORY IN THE Z80'S ADDRESS SPACE. THE Z80 CPU CAN READ AND WRITE (UPDATE) TO THESE LOCATIONS QUITE FREELY. VRAM IN THE VZ IS A FIXED AREA OF MEMORY THAT IS ALSO REFERENCED BY THE 6847 VDG. THE LOCATION OF THE BUFFER IS CHOSEN BY THE PROGRAMMER AND THEREFORE THE VDG DOES NOT KNOW WHERE IT EXISTS. OBVIOUSLY THE POTENTIAL FOR CONFLICT, BETWEEN THE TWO DEVICES' REQUESTS FOR ACCESS TO VRAM, EXISTS HERE. THE SCREEN OR DISPLAY IS A PHYSICAL DEVICE THAT THE Z80 KNOWS NOTHING ABOUT. (THE VZ WILL RUN WITHOUT A SCREEN).

THE VDG AND A LOT OF DISPLAY CIRCUITRY INTERFACE BETWEEN VRAM AND THE IMAGE FORMED BY AN ELECTRON BEAM SCANNING ACROSS PHOSPHORS. THE VDG CONTAINS AN INTERNAL ROM HOLDING A SHAPE TABLE THAT DECODES ASCII INTO VISUAL IMAGES. ONCE THESE COMPONENTS ARE CLEARLY DISTINGUISHED, AND THEIR ABILITY TO COMMUNICATE AMONGST THEMSELVES IS APPECIATED, IT BECOMES EASY TO DEVISE A SOLUTION TO THEIR MUTUAL INTERFERENCE THAT LEADS TO FLICKER.

THE INTERRUPT (AS DETAILED IN MY PREVIOUS ARTICLE ON VECTORS, INTERRUPTS AND REAL TIME CLOCK) IS ONE SUCH TIMING PULSE THAT CAN ASSIST. EVERY 20 MSEC. AN INTERRUPT SIGNAL IS DEVELOPED BY THE VDG. WHEN THE INTERRUPT OCCURS, THE Z80 COMPLETES THE CURRENT INSTRUCTION AND THEN VECTORS TO THE INTERRUPT HANDLING ROUTINE. AFTER COMPLETION OF THIS ROUTINE, THE Z80 RESUMES ITS PREVIOUS TASK. THE INTERRUPT PULSE ORIGINATES FROM THE VDG AND IS NOTIFIED BY *FS LINE.

THIS IS CONNECTED TO THE MASKABLE INTERRUPT LINE ON THE Z80 WHICH CAN BE ENABLED/DISABLED BY SOFTWARE COMMANDS. THE IMPORTANT FEATURE OF THE *FS LINE GOING LOW IS THAT IT ALLOWS VIDEO SYNCHRONIZATION OF THE ELECTRON BEAM LOCATION ON THE SCREEN WITH THE Z80 WRITE-TO-VRAM ACTIVITY. (I.E. EXACTLY WHAT WE ARE LOOKING FOR) BY DETECTING THE MASKABLE INTERRUPT EVENT IN THE Z80 IT IS POSSIBLE TO TIME VRAM WRITE-OPERATIONS SUCH THAT FLICKER IS AVOIDED. TO SEE HOW THIS IS ACHIEVED, IT IS NECESSARY TO CONSIDER HOW THE SCREEN SCANNING HAPPENS.

THE VZ TECHNICAL MANUAL AND MY ARTICLES IN SEPT. AND OCT. AEM 1986, PROVIDE SOME INSIGHT INTO SCREEN SCANNING AND THE WORKINGS OF THE VDG. THE ELECTRON BEAM STARTS AT THE TOP LEFT-HAND CORNER OF THE SCREEN AND MOVES TO THE RIGHT. IN SO DOING, THE VDG PUTS ONTO THE DISPLAY, PART OF 32 CHARACTERS ON THE SCAN LINE.(THIS IS OF COURSE DESCRIBING THE LO-RES SCREEN SITUATION).

DURING THIS TIME, THE INTENSITY OF THE BEAM IS REGULATED BY THE VDG REFERENCING VRAM. A "HORIZONTAL RETRACE" OCCURS THAT IS INVISIBLE - ALSO THE BEAM DROPS DOWN ONE SCAN LINE (THIS PERIOD CORRESPONDS TO 8 "INVISIBLE" CHARACTERS BEING SCANNED). THERE ARE ACTUALLY 192 "VISIBLE" SCAN LINES DOWN THE VZ SCREEN. THIS CORRESPONDS TO 12 SCAN LINES PER LINE OF TEXT. THE VDG CERTAINLY EARNS ITS KEEP TRANSLATING 32 ASCII REPRESENTATIONS PER LINE INTO ELECTRON BEAM INTENSITIES!

SO MUCH FOR THE VISIBLE OR ACTIVE PORTION OF THE SCREEN. THERE ARE ALSO "INVISIBLE" PORTIONS OF THE SCREEN - FOR EXAMPLE THE TOP AND BOTTOM BORDERS OF THE SCREEN. ALSO, ONCE THE ELECTRON BEAM REACHES THE BOTTOM RIGHT-HAND PORTION OF THE SCREEN, IT MUST "FLYBACK" TO THE TOP LEFT-HAND CORNER. THIS IS CALLED THE "VERTICAL RETRACE".

THERE IS ALSO ANOTHER PERIOD CALLED "BLANKING" WHICH IS A TIMING PAUSE TO ALLOW THE OVERWORKED ELECTRON BEAM TO CATCH ITS BREATH BEFORE COMMENCING ANOTHER SCREEN! GOT ALL OF THAT! IN TOTAL, ALL OF THIS BEAM ACTIVITY CORRESPONDS TO 312 SCAN LINES - AND IT ALL OCCURS IN 20 MSEC. OR 50 TIMES PER SECOND. FOR THOSE WHOSE MATHS CAN STAND IT, EACH SCAN LINE TAKES 0.064 MSEC. AND EACH LO-RES TEXT LINE TAKES 0.77 MSEC. FOR THE VDG TO PLACE UPON THE SCREEN.

THIS SET-UP CAN BE ILLUSTRATED BY THE FOLLOWING SUMMARY -

50	LINES	(3.21 MSEC.)	TOP BORDER.
192	LINES	(12.31 MSEC.)	ACTIVE DISPLAY.
51	LINES	(3.27 MSEC.)	BOTTOM BORDER.
6	LINES	(0.38 MSEC.)	VERTICAL RETRACE.
13	LINES	(0.83 MSEC.)	BLANKING.
---	-----	----- -----	
312	LINES	(20.00 MSEC.)	

THE *FS LINE OF THE VDG GOES LOW (HIGH TO LOW TRANSITION) AT THE END OF THE ACTIVE DISPLAY AREA - I.E. BEFORE THE BOTTOM BORDER IS REACHED. THE TIME WHEN THE ELECTRON BEAM IS SCANNING "INVISIBLE" PORTIONS OF THE SCREEN IS MARKED BY THIS SIGNAL, WHICH, IN TURN, TRIGGERS THE MASKABLE INTERRUPT IN THE Z80. DURING THIS TIME, THE CPU MAY HAVE TOTAL ACCESS TO VRAM WITHOUT CAUSING UNDESIRABLE FLICKER ON THE SCREEN. THE AMOUNT OF TIME AVAILABLE TO THE Z80 IS 7.69 MSEC. OUT OF THE 20 MSEC. BETWEEN EACH SCREEN REFRESH. NOTE HOWEVER, THAT THE LOW TO HIGH TRANSITION OF *FS COINCIDES WITH THE TRAILING EDGE OF THE VERTICAL SYNC PULSE - THAT IS, IT STAYS LOW FOR ONLY 3.65 MSEC. OR SOME 18% OF THE REFRESH CYCLE.

CONTINUED NEXT ISSUE:

CHANGE GRAPHICS MACHINE CODE AND SOURCE CODE LISTING BY BRIAN GREEVE

ERROR & APOLOGY: IN ISSUE # 29, PAGE 12, THE MACHINE CODE LISTING ADDRESSES WERE INCORRECT WHILE THE SOURCE CODE WAS OK. THE CORRECTED VERSION IS REPRODUCED BELOW. MY APOLOGIES TO BRIAN AND OUR READERS. THE MISTAKE WAS MINE, NOT BRIAN'S. . . JOE LEON, ED.

MACHINE CODE – SOURCE CODE

```
                    ;
                    ;   ### CHANGE GRAPHICS ###
                    ;TO CONVERT GRAPHIC CODE
                    ;TO ALLOW PRINT OUT BY
                    ;STANDARD PRINTER (TANDY)
                    ;V 2 JUNE 29 89   ORG 7200H
                    ;
7200 CD C9 01             CALL 01C9H
7203 21 E9 7A             LD   HL,7AE9H
7206 22 A4 78             LD   (78A4H),HL
7209 23             INC4  INC  HL
720A 23             INC3  INC  HL
720B 23                   INC  HL
720C 23             INC   INC  HL
720D 7E             MP    LD   A,(HL)
720E FE 22                CP   34
7210 28 12                JR   Z,TEXT
7212 FE 00                CP   0
7214 20 F6                JR   NZ,INC
7216 23             SZ    INC  HL
7217 B6                   OR   (HL)
7218 20 EF                JR   NZ,INC4
721A 23                   INC  HL
721B B6                   OR   (HL)
721C 20 EC                JR   NZ,INC3
721E 22 F9 78             LD   (78F9H),HL
7221 C3 19 1A             JP   1A19H
7224 23             TEXT  INC  HL
7225 7E                   LD   A,(HL)
7226 FE 22                CP   34
7228 28 E2                JR   Z,INC
722A FE 00                CP   0
722C 28 E8                JR   Z,SZ
722E FE 7F                CP.  7FH
7230 38 F2                JR   C,TEXT
7232 FE BF                CP   0BFH
7234 38 09                JR   C,GRPH
7236 FE DF                CP   0DFH
7238 38 09                JR   C,INVA
723A D6 C0                SUB  0C0H
723C 77             AA    LD   (HL),A
723D 18 E5                JR   TEXT
723F 3E 23          GRPH  LD   A,23H
7241 18 F9                JR   AA
7243 D6 80          INVA  SUB  80H
7245 18 F5                JR   AA
BYTES FREE :- 22475 ERRORS : 00000
```

*** NEW — FOR SALE — NEW ***

```
*************************************************************************
*
*     LOOK !!!! ---  PROGRAMS FOR SALE  ---  ALL NEW !!!!               *
*                                                                       *
*************************************************************************
```

<1> V Z D I S A S S E M B L E R

################################

WHAT, ANOTHER DISASSEMBLER? BUT, YOU HAVE ALREADY GOT ONE? THIS ONE IS DIFFERENT!

THIS PROGRAM IS ENTIRELY WRITTEN IN MACHINE CODE. IT ACTUALLY RUNS ABOUT 40 TIMES FASTER THAN D.S.E.'S DISASSEMBLER (OR ANY ONE ELSE'S). IT WILL DISASSEMBLE ANY PROGRAM THAT YOU CAN BLOAD INTO MEMORY. IT WORKS WITH ANY VZ CONFIGURATION. IT DISASSEMBLES EVEN THE 88 EXTRA Z80 OPCODES THAT ZILOG DOESN'T ADMIT TO.

PRICE? ONLY $25.00 - TAPE AND DISK VERIONS AVAILABLE.

PRICE INCLUDES HARDCOPY MANUAL. INTERESTED? YOU MAY PURCHASE THIS PROGRAM FROM PETER HICKMAN, FOR ADDRESS SEE BELOW.

```
*************************************************************************
*
* BRAND NEW  -  VZ SERIAL INTERFACE PROGRAM  -  BRAND NEW               *
*                                                                       *
*************************************************************************
```

<2> V Z M O D E M S O F T W A R E

###################################

DID YOU WANT TO TALK TO OTHER COMPUTERS VIA A MODEM? DID YOU BUY THE DSE TERMINAL EPROM, ONLY TO DISCOVER THAT IT ONLY WORKS WITH TAPE. IT ONLY ALLOWS YOU TO PRINT FILES, NOT SAVE THEM OR SEND THEM!

YOUR PROBLEMS ARE SOLVED! THE HICKMAN BROTHERS, PETER AND ANDREW, HAVE A BRAND NEW PROJECT WHICH WILL ALLOW YOU TO SEND, RECEIVE & SAVE FILES VIA A MODEM. IT WORKS WITH DISK!

SALE PRICE $25.00 ONLY

INCLUDED ARE INSTRUCTIONS FOR THE HARDWARE MODIFICATIONS.

A SMALL MODIFICATION IS NEEDED TO YOUR DISK CONTROLLER. YOUR USER GROUP MAY HELP YOU MODIFY YOUR COMPUTER TO USE THIS EXCITING NEW SOFTWARE! IF YOU HAVE THE FUNCTION KEYS MOD AS WELL, THEN YOU WILL BE ABLE TO SEND EXTRA ASCII CHARACTERS SUCH AS:-

{ ¦ } ~ _

THE MANUAL IS SUPPLIED ON DISK FOR YOU TO PRINT OUT WITH YOUR DISK VERSION OF E & F WORDPROCESSOR. IF YOU DO NOT OWN AN E & F WORDPROCESSOR PROGRAM, PLEASE ENCLOSE ANOTHER $5.00 (TOTAL $30.00) FOR PHOTOCOPYING AND POSTAGE OF THE MANUAL.

FOR PURCHASE OR MORE INFORMATION CONTACT:-
PETER HICKMAN P.O. BOX 8, WERRINGTON N.S.W. 2747.

CONTRIBUTIONS TO THE HUNTER VALLEY VZ JOURNAL :-

IF YOU ARE THINKING OF CONTRIBUTING TO THE JOURNAL THE PREFERED FORMAT IS BASIC LISTINGS, WORD PROCESSOR OR SOURCE CODE FILES ON TAPE OR DISK. FILES FROM THE FOLLOWING WORD PROCESSORS CAN BE ACCEPTED :-

E & F TAPE OR DISK PATCH 3.1-3.3, WORDPRO CARTRIDGE, WORDPRO PATCH, MOST SOURCE CODE FILES AND ALL QUICKWRITE WORD PROCESSOR FILES.

** ** CLUB MEETINGS - ALL WELCOME ** **

FIRST FRIDAY OF MONTH - NO MEETING IN JANUARY 1991

VENUE - JESMOND NEIGHBOURHOOD CENTRE MORDUE PARADE JESMOND
(REAR STOCKLAND MALL - BIG W)

NOVEMBER 2 - COMPUTER SHOW REVIEW
SETTING MEMORY & BANK SWITCHING STANDARDS
COLLATING & SETTING INPUT/OUTPUT STANDARDS
BASIC - MACHINE CODE & ASSEMBLY CONTINUED

DECEMBER 7 - REVIEWING 1990 & PREVIEWING 1991
BASIC - MACHINE CODE & ASSEMBLY CONTINUED
CHRISTMAS PARTY - BRING FAMILY - FRIENDS - PLATE
HOT & COLD LIQUID REFRESHMENTS PROVIDED - ALL WELCOME

FUTURE DEMONSTRATIONS -

EPROM PROGRAMMER & ERASER, AUCTION NIGHT - USING THE VZ, RITTY, ETC. IF YOU HAVE ANY IDEAS FOR A DEMONSTRATION OR A SUBJECT THEN PLEASE LET YOUR COMMITTEE KNOW.

CLUB COMMITTEE & SUBSCRIPTIONS -

PRESIDENT --------- ROSS WOODS --- (049) 71 2843
SECRETARY/EDITOR -- JOE LEON ----- (049) 51 2756
TREASURER --------- GARY BULLEY -- (049) 54 7561
COMMITTEE MEMBERS - COLIN BRIDGE - PETER JONES

SUBSCRIPTION TO - AUST. - 6 MONTHS $11.00 - 12 MONTHS $21.00
H.V.VZ.JOURNAL - N. Z. - 6 MONTHS $13.00 - 12 MONTHS $26.00

HUNTER VALLEY VZ USERS' GROUP - PO BOX 161 JESMOND 2299
NEW SOUTH WALES AUSTRALIA

VZ USER GROUPS & PUBLICATIONS --

VZ DOWN UNDER - VZ MAGAZINE - 6 ISSUES - $18.00 PER ANUM
HARRY HUGGINS 12 THOMAS SREET MITCHAM VICTORIA 3132

WAVZ - WESTERN AUSTRALIA VZ USER GROUP
GRAEME BYWATER P O BOX 388 MORLEY W A 6062

BRISBANE VZ USERS WORKSHOP - C/O 63 TINGALPA ST. WYNUM WEST 4178
SOFTWARE FOR SALE - DISK MENU

SAPPHIRE PRODUCTIONS - VZ DISK MAGAZINE - $20.00 PER ANUM
CONTACT JASON OAKLEY PO BOX 600 TAREE NSW 2430

NOTE : WHEN WRITING TO ANY ABOVE OR H.V.VZ. USERS' GROUP FOR INFORMATION PLEASE ENCLOSE A S.S.A.E. OR NZ 2 INT. REPLY COUPONS.

FOR SALE E & F W.P. PATCH 3.3 31/20

PATCH 3.3 WRITTEN BY DAVE MITCHELL WILL CONVERT YOUR E & F TAPE WORD PROCESSOR FOR FULL DISK USE WHILE RETAINING ALL ORIGINAL FUNCTIONS. BELOW ARE ADDED DISK COMMANDS & FUNCTIONS :-

LOAD, SAVE, ERASE, RENAME, DIRECTORY, INITIALIZE, UPDATE, DRIVE 1 & 2, SHIFTLOCK & IMBEDDED PRINTER CONTROL CODES PLUS CTRL+P WHICH BYPASSES PRINT MENU AND PRINTS TO SCREEN OR PRINTER. A ROUTINE IS ALSO PROVIDED TO CONVERT YOUR BASIC PROGRAM OR SOURCE CODE FILES INTO WORD PROCESSOR FILES.

PATCH 3.3 HAS PROVISION FOR IMBEDDING PRINTER CONTROL CODES IN TEXT AND FAST SAVING AND LOADING OF TEXT DATA TO AND FROM DISK USING BLOCK SAVE/LOAD TECHNIQUES. PRINTER CONTROL CODES CAN BE SAVED TO TAPE OR DISK.

BSTWP.F - THIS UTILITY PROVIDED WITH PATCH 3.3 WILL CONVERT BASIC PROGRAMS AND ED/ASS. SOURCE CODE FILES INTO WORD PROCESSOR FILES.

SYSTEM REQUIREMENTS - VZ 300 + 16K RAM PACK - VZ 200 + 26K

PATCH 3.3 IS COPYRIGHT TO AND ONLY AVAILABLE FROM :-
HUNTER VALLEY VZ USERS' GROUP P.O.BOX 161 JESMOND 2299
N.S.W. AUSTRALIA - PHONE JOE LEON (049) 51 2756

PRICE - AUS/NZ AU$20.00 - UPDATE - AUS-$10.00 - NZ-AU$11.00.
UPDATING AVAILABLE ONLY TO PREVIOUS PURCHASERS OF PATCHES.

FOR MORE INFORMATION WRITE TO H.V.VZ.U.G. ENCLOSING A SSAE.

EXTENDED DOS V1.3 - $15.00

UPDATED VERSION WITH EXTRA COMMANDS ADDED :-

OLD COMMANDS - MERGE, DIRA, LDIRA, DIRB, LDIRB, OLD, OLD., DEC, HEX, STATUSA AND LSTATUSA. STATUSA AND LSTATUSA ALSO WORKS WITH VERSION 1.0 DOS.

NEW COMMANDS :-

MENU - LOADS AND RUNS BINARY OR TEXT MENU PROGRAM FROM DISK.
CODE - SIMPLIFIES USING PRINTER CONTROL CODES DIRECTLY OR FROM WITHIN A PROGRAM.
LTAB - IS FOR SETTING OF LEFT MARGIN.
MOVE - MOVES BASIC FILE FROM DISK TO CHOSEN MEMORY ADDRESS.
UPD - ERASES OLD FILE AND SAVES WITH SAME FILE NAME.

MENU/FILE COPIER - $15.00

THIS UTILITY WILL READ YOUR DISK DIRECTORY AND PRESENT YOU WITH SEVERAL OPTIONS. USING THE CURSOR YOU CAN RUN/BRUN ANY PROGRAM OR SELECT FILE COPY, REN, ERASE, DRIVE 1 OR 2, ETC. BESIDES COPYING TEXT AND BINARY FILES ALL OTHER FILES CAN BE COPIED AS WELL EXEPT FOR DATA FILES.

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